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EXAMINER

MARTINEZ, JOSEPH P

ART UNIT

PAPER NUMBER

2873

DATE MAILED: 12/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/818,304

Applicant(s)

TAKADA, KYU

Examiner

Joseph Martinez

Art Unit

2873

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 7-9 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brommer et al. (5,389,943) in view of Burt et al. (6,052,213).

Re claim 1, Brommer et al. teach for example, an optical device (dielectric structure 20, fig. 1, col. 1, ln. 63-68, col. 2, ln. 1-11) comprising: a first medium (high-dielectric background material 24, fig. 1, col. 1, ln. 63-68, col. 2, ln. 1-11) having a thickness, the first medium defining a plurality of periodically spaced hollow portions throughout a first layer (elongated elements 22, fig. 1, col. 1, ln. 63-68, col. 2, ln. 1-11) of the first medium; and a second medium (elongated elements 22 made up of non-conductive low-dielectric material, fig. 1, col. 1, ln. 63-68, col. 2, ln. 1-11), being dispersed within the hollow portions formed in the first medium, wherein a first layer of the device forms a photonic crystal and includes the first layer of the first medium, and wherein a second layer of the device is formed entirely of the first medium, but fail to teach the hollow portions having a depth less than the thickness of the first medium. However, Burt et al. teach for example, the hollow portions (holes H, fig. 5) having a depth less than the thickness of the first medium (planar substrate 2, fig. 5). The office interprets the planar substrate in fig. 5 of Burt et al. to be equivalent in structure to the high-dielectric background material in fig. 1 of Brommer et al. Therefore, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to combine the teachings of Brommer et al. with Burt et al. in order to control the light mode.

Re claim 7, Brommer et al. further teach for example, an optical device comprising: a first medium having a thickness, the first medium at least partially forming a first layer and a second layer of the optical device, the first layer having a plurality of periodically spaced protruding portions surrounded by hollow portions; and a second medium being dispersed within the hollow portions surrounding the plurality of periodically spaced protruding portions of the first layer, wherein the first layer is a photonic crystal, and the second layer is formed entirely of the first medium (fig. 1, col. 1, ln. 63-68, col. 2, ln. 1-11), but fail to teach having a depth less than the thickness of the first medium. However, Burt et al. teach for example, the hollow portions (holes H, fig. 5) having a depth less than the thickness of the first medium (planar substrate 2, fig. 5). The office interprets the planar substrate in fig. 5 of Burt et al. to be equivalent in structure to the high-dielectric background material in fig. 1 of Brommer et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Brommer et al. with Burt et al. in order to control the light mode.

Re claim 19, Brommer et al. further teach for example, an optical device comprising: a first medium having a thickness, the first medium at least partially forming a first layer and a second layer of the optical device, the first layer defining a plurality of periodically spaced hollow portions, and a second medium being dispersed within the hollow portions, wherein the first layer of the optical device forms a photonic crystal, and wherein the second layer of the device is formed at least partially of the first medium, but fail to teach the hollow portions having

a depth less than the thickness of the first medium. However, Burt et al. teach for example, the hollow portions (holes H, fig. 5) having a depth less than the thickness of the first medium (planar substrate 2, fig. 5). The office interprets the planar substrate in fig. 5 of Burt et al. to be equivalent in structure to the high-dielectric background material in fig. 1 of Brommer et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Brommer et al. with Burt et al. in order to control the light mode.

Re claims 2-3, 8-9 and 20-21, supra claims 1, 7 and 19. Burt et al. further teach for example, the first medium has an index of refraction and the second medium has an index of refraction different than the index of refraction of the first medium, wherein the index of refraction of the second medium is greater than the index of refraction of the first medium (col. 5, ln. 50-52). The office interprets "having a different refractive index to the substrate" to include having either a higher or lower refractive index. Therefore the limitations set forth in claims 2-3, 8-9 and 20-21 are taught.

Claims 4-6 and 10-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burt et al. in view of Brommer et al.

Re claim 4, Burt et al. teach for example, a method of manufacturing an optical device having a first layer functioning as an optical waveguide layer and a second layer functioning as a base layer, the method comprising the steps of: providing a resist layer on a surface of a first medium; removing portions of the resist layer to form vacancies; removing portions of the first medium corresponding to the vacancies to create cavities in the first medium, the depth of the cavities being less than a thickness of the first medium; removing the resist layer completely;

filling the cavities in the first medium with a second medium; and removing any excess film of the second medium from the surface of the first medium (col. 5, steps 1-9, ln. 5-65), but fail to teach the first medium comprising one material. However, Brommer et al. teach for example, the first medium comprising one material. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Burt et al. and Brommer et al. to provide a substrate comprising one material for ease of manufacturing.

Re claim 10, Burt et al. teach for example, a method of manufacturing an optical device having a first layer functioning as an optical waveguide layer and a second layer functioning as a base layer, the method comprising the steps of: providing a resist layer on a surface of a first medium; removing portions of the resist layer to form vacancies; removing portions of the first medium corresponding to the vacancies to create cavities in the first medium, the depth of the cavities being less than a thickness of the first medium; filling the cavities in the first medium with a second medium (col. 5, steps 1-9, ln. 5-65), but fail to teach removing the resist layer and any excess film of the second medium from the surface of the first medium and the first medium comprising one material. However, Brommer et al. teach for example, the first medium comprising one material. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Burt et al. and Brommer et al. to provide a substrate comprising one material for ease of manufacturing. Also, it is a fundamental design choice to combine the steps of 6 and 8 of Burt et al. to save time in the manufacturing process.

Re claim 13, Burt et al. teach for example, an optical device having a first layer functioning as an optical waveguide layer and a second layer functioning as a base layer, formed

by a method comprising the steps of: providing a resist layer on a surface of a first medium; removing portions of the resist layer to form vacancies; removing portions of the first medium corresponding to the vacancies to create cavities in the first medium, the depth of the cavities being less than a thickness of the first medium; removing the resist layer completely; filling the cavities in the first medium with a second medium; and removing any excess film of the second medium from the surface of the first medium (col. 5, steps 1-9, ln. 5-65), but fail to teach the first medium comprising one material. However, Brommer et al. teach for example, the first medium comprising one material. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Burt et al. and Brommer et al. to provide a substrate comprising one material for ease of manufacturing.

Re claim 16, Burt et al. teach for example, an optical device having a first layer functioning as an optical waveguide layer and a second layer functioning as a base layer, formed by a method comprising the steps of: providing a resist layer on a surface of a first medium; removing portions of the resist layer to form vacancies; removing portions of the first medium corresponding to the vacancies to create cavities in the first medium, the depth of the cavities being less than a thickness of the first medium; filling the cavities in the first medium with a second medium (col. 5, steps 1-9, ln. 5-65), but fail to teach removing the resist layer and any excess film of the second medium from the surface of the first medium and the first medium comprising one material. However, Brommer et al. teach for example, the first medium comprising one material. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Burt et al. and Brommer et al. to provide a substrate comprising one material for ease of manufacturing. Also, it is a

fundamental design choice to combine the steps of 6 and 8 of Burt et al. to save time in the manufacturing process.

Re claims 5-6, 11-12, 14-15 and 17-18, supra claims 4, 10, 13 and 16. Burt et al. further teach for example, the first medium has an index of refraction and the second medium has an index of refraction different than the index of refraction of the first medium, wherein the index of refraction of the second medium is greater than the index of refraction of the first medium (col. 5, ln. 50-52). The office interprets "having a different refractive index to the substrate" to include having either a higher or lower refractive index. Therefore the limitations set forth in claims 11-12, 14-15 and 17-18 are taught.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Martinez whose telephone number is 703-305-0577. The examiner can normally be reached on T-F 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 703-308-4883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7724 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-4883.

JPM  
December 10, 2002

  
Hung Xuan Dang  
Primary Examiner